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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/754,481

01/09/2004

David S. Tuch

MGH-027AUS

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7590

05/06/2005

DALY, CROWLEY, MOFFORD & DURKEE, LLP  
SUITE 101  
275 TURNPIKE STREET  
CANTON, MA 02021-2310

EXAMINER

VARGAS, DIXOMARA

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/754,481	<b>Applicant(s)</b> TUCH ET AL.	
	<b>Examiner</b> Dixomara Vargas	<b>Art Unit</b> 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 10-14 and 19-21 is/are rejected.
- 7) ☒ Claim(s) 5-9, 15-18, 22 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 10-14 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ackerman et al. (US 6,185,444 B1).

With respect to claims 1, 11 and 20, Ackerman discloses a method of imaging comprising: receiving magnetic field gradient directions specified for an MRI scan of a microscopic structure, generating images for each magnetic field gradient direction (Column 8, lines 52-67), collecting pixel information from the generated images for a given pixel of interest (Columns 10 and 15, lines 46-57 and 59-66 respectively); assembling the pixel data onto a surface of at least one sphere (Column 8, lines 52-67); and determining properties of a diffusion function on the at least one sphere by transforming the pixel data assembled onto the surface of the at least one sphere using a spherical transform (Abstract; Columns 8-9, lines 52-67 and 1-11 respectively).

3. With respect to claims 2 and 12, Ackerman discloses repeating the steps of collecting, assembling and calculating for each additional pixel of interest (Column 8, lines 52-67).

4. With respect to claims 3 and 13, Ackerman discloses displaying results of the diffusion function properties determination (Column 8, lines 52-67).

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5. With respect to claims 4, 14 and 21, Ackerman discloses the properties of the diffusion function on the at least one sphere comprise an orientation distribution function (ODF) (Column 8, lines 52-67).
6. With respect to claims 10 and 19, Ackerman discloses the microscopic structure comprises a microscopic tissue structure (Abstract).

***Allowable Subject Matter***

7. Claims 5-9, 15-18, 22 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter:
  - a. With respect to claims 5 and 15, the claims have been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method of imaging comprising the step of determining comprising: if the at least one sphere comprises multiple spheres, adding corresponding pixel data assembled on surfaces of the multiple spheres to produce pixel data for one sphere; selecting a direction through such sphere; identifying the major circle for the selected direction, computing pixel values on the major circle by interpolating the pixel data on the sphere; calculating an ODF value for the selected direction by adding the pixel values on the major circle; determining if other directions are to be selected; and if other directions are to be selected, repeating the steps of selecting, identifying, computing and calculating for each of the other directions in combination with the remaining limitations of claim 1 and 4 above.

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- b. With respect to claims 6 and 7, the claims have been found allowable due to their dependency on claim 5 above.
- c. With respect to claims 8, 17 and 22, the claims have been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method of imaging comprising the step wherein the spherical transform comprises a Funk-Radon transform in combination with the remaining limitations of claim 1 above.
- d. With respect to claims 9, 18 and 23, the claims have been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method of imaging comprising the step wherein the radius of the at least one sphere is chosen according to a length scale of interest in combination with the remaining limitations of claim 1 above.
- e. With respect to claim 16, the claim has been found allowable due to its dependency on claim 15 above.

### ***Conclusion***

- 9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional prior art cited in the PTO 892 discloses MR systems with sphere k-space.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (571) 272-2252. The examiner can normally be reached on Monday to Thursday from 8:00 am. to 4:30 pm..

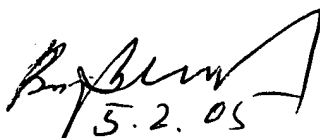
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dixomara Vargas  
Art Unit 2859  
April 29, 2005



BRIJ SHRIVASTAV  
PRIMARY EXAMINER